January 27, 1948.

Dear Jacques,

Thanky you very much for your manuscript. I have read it carefully, and with great interest. You have not indicated whether you wish it to be returned; I will hasten to do so at your word.

I have been doing some experiments lately on adaptation for galactosidase which may interest you. K-12 will develop this enzyme to varying extents on different substrates. If the activity per cell, as measured with nitrophenyl galactoside, is counted as 100 for lactose, the relative activities of cells harvest from broth with the indicated substance as secondary carbon source are as follows:

n-butyl b- galactoside	115
lactose	100
lactobionate	73
galactose	23
galactonate	
mucate	ca 2
dulcitol	
l-arabinose	less than 1, probably
d-glucose	due to adaptation during the measurement (20 mins.)

This is for K-12. Lac_1- and Lac_3- stocks do not respond to lactose but will to butyl galactoside and to galactose. Lac_2- does not form the enzyme under any condition tested, and the same is probably true for Lac_4- and Lac_6-.

You can probably see, therefore, why I have concluded that most of the genetic effects are indirect, and on the competence of the adaptation mechanism.

Cells of E. coli ML (L4) will split nitrophenyl galactoside if, and they are grown on lactose, and to a far lesser extent if grown on galactose (5% of the lactose cells activity.) Glucosegrown cells, of course, have no measurable activity. I am enclosing a few mg. of nitrophenyl galactoside, for your use if you would like to test the activity of your "purified" lactase.

For the above table, I should note that lactobionate, which is a very effective evocator of galactosidase, is not utilizable for growth or fermentation by K-12. Likewise, galactose has the same adaptive potence for galactosidase formation on mutants which are incapable of using galactose as for K-12. Thus utilization and adaptation have been separated in both ways. (Lactose, for Lac_1- is not does not evoke the enzyme but is utilized by it; lactobionate is not utilized but does evoke.)

The pH optimum for galactosidase extracts is 7.3. For intact cells is is closer to 7.0 The Na stimulations and Rb inhibitions which have been noted with the extracts are not demonstrable with the intact cells, indicating that the enzyme may be protected. The apparent Km is about 4×10^{-4}, almost 4x as high as for the extract. This difference may be due to the fact that diffusion is the rate limiting step, and this is being studied.

Good luck on your trip to London, and let me know if anything interesting comes up.

Sincerely,